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## (54) Connecting piece for connecting a wiper blade to a wiper arm

(57) An arm coupling element for windscreen wiper that solves the problem entailed by the multiplicity of fastening device coupling elements and arms.
The present invention provides a universal device that allows the installation by the user, in a simple, easy and quick way.
The present invention comprises a central body (1), three transversal coupling bores (2,3,4) of different dimensions set on the central area of said main body (1) that presents the lower part of its lateral walls cut away allowing direct access to said transversal coupling bores (2,3,4), two lateral bulges (5,6) located at both lateral walls of the main body (1), being one in each of its ends, two flexible adjustment pawls (7,8) located transversally on the upper part of the main body (1), a slack reducing moving part (9) located at the end of the main body (1) over which rests the windscreen wiper's arm hook (101), two transversal slots (10,11) adjacent to the central hole (3) and two moving locking bulges (12,13) located at the end of the main body (1) between which rests the windscreen wiper's arm hook (101).

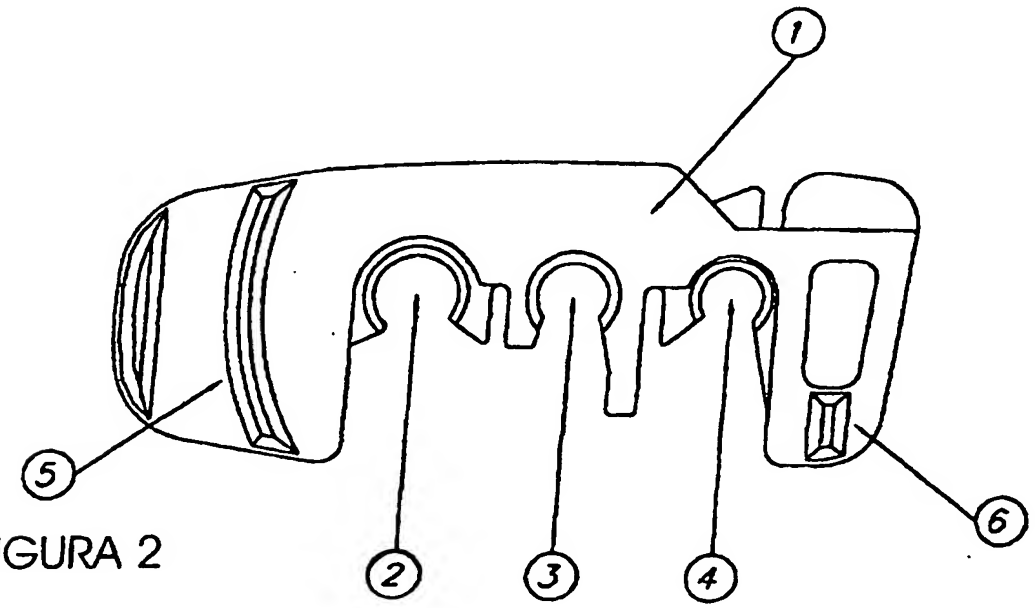


FIGURA 2

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## Description

### Field of the Invention

[0001] The present invention relates to an "ARRANGEMENT OF SHAFT COUPLING ELEMENT FOR WINDSCREEN WIPER", applied to windscreen wipers in general. The present invention reveals a shaft coupling element for windscreen wiper that solves the problem entailed by the multiplicity of fastening device coupling elements and shafts.

[0002] The main objective of the present invention is to provide a universal device that allows the installation by the user, in a simple, easy and quick way.

### Background of the Invention

[0003] The coupling elements of the current state of the art systems present a multiplicity of forms, each one specifically designed to allow the fastening of a certain type of coupling element to a certain type of shaft.

[0004] The current state of the art presents some endeavors towards the universalization of the shaft coupling element for windscreen wiper, as for example the Brazilian Patent Application MU 8000354-0 of the same Applicant, which nevertheless presents some of the inconveniences described herein below.

### Current State of the Art Inconveniences

[0005] The current state of the art presents some inconveniences.

[0006] The lack of a market standard in the auto-parts market forces the manufacturers of shaft coupling elements for windscreen wipers to produce a wide variety of specific models for their coupling elements. That generates several inconveniences such as logistical problems, the need for larger stocks and higher manufacturing costs.

[0007] The configuration of the current art shaft coupling elements for windscreen wipers makes for a difficult mounting of the wiper on the shaft, requiring the use of force to lock-up the connection between the system components. An imprecise use of force upon an element that is sensitive to deformation creates a risk of damage/distortion that could eventually hamper the system's performance.

[0008] Another negative aspect, specially in those cases in which the locking between the wiper and the shaft is based on a system known by those skilled in the art by the name of side-lock, is that the assembly of the device by the user requires a certain level of skill, both to assemble and disassemble it.

[0009] The rotation of the wiper's arc is paramount for the system's performance, because this movement compensates the variation of the relative positioning between the wiper's shaft and the external face of the windshield. In some of the current art devices, such as the one revealed on the Brazilian Patent Application MU 8000354-0 of the same Applicant, at least one of the elements employed to stabilize the coupling between the wiper and the coupling element interferes with the rotation movement of the wiper's arc, harming the system's performance.

### Brief Description of the Invention

[0010] The present invention solves the inconveniences associated with the current state of the art through the use of an optimized universal device that allows the assembly by the user. It can be used on systems having a shaft with hook-shaped ends of 9x4, 9x3 or 8x3 and also on side-lock coupling systems of 1/4" or 3/16". The invention presents a single coupling element that is compatible with 5 different types of coupling between wiper and shaft, by means of a system that comprises 2 lateral pawls and 3 transversal bores.

[0011] The present invention will be better described with the aid of the annexed Figures, of which:

Figure 1 is a lower plan view of the present invention;
Figure 2 is a front view of the present invention;
Figure 3 is a lateral cross section view of the present invention;
Figure 4 is a front view of the present invention depicting the assembly of a shaft with a hook-shaped end;
Figure 5 is a front view of the present invention depicting the assembly of the 1/4" side-lock coupling.

[0012] According to the figures indicated above, the coupling element of the present invention comprises a main body (1) featuring 3 transversal bores (2, 3 and 4), used respectively for the coupling of the 1/4" side-lock pin, the wiper's central pin and the 3/16" side-lock pin.

[0013] To couple the shaft (101) with a 8x3 hook on its end, the invention presents two lateral pawls (7 and 8) designed to provide a perfect adjustment of the shaft's hook with its corresponding coupling element.

[0014] With the purpose of ensuring an easy side-lock coupling, the bores 2 and 4 of the present invention's coupling element alternatively present guiding chamfers to guide such coupling.

[0015] For the coupling between the coupling element and the shaft ends equipped with 9x4 or 9x3 hooks, the two lateral pawls (7 and 8) are flexed, opening space to accommodate the shaft (101) end hook between the side walls of the coupling element. Further, the invention presents a moving claw (9). The claw (9) function is to eliminate any possible slack between the coupling element and the shaft (101) end hook.

[0016] The present invention also features two jags (10 and 11) adjacent to the central bore (3), designed to add higher flexibility to the system, ensuring the easiness of assembly of the coupling element to the wiper's

central pin and also the assembly of the pins on the side-lock coupling.

**[0017]** There are also two bulges (12 and 13) which purpose is to avoid the undesired disassembly of the system during it's operation.

**[0018]** Figure 4 shows the assembly of the shaft end hook (9x4, 9x3 or 8x3) to the coupling element, made by means of a small rotation of the coupling element, positioning the wiper in such a way that the shaft (101) end hook is set inside the main arc of the of the wiper (102) and pushing the wiper against the shaft (101) end hook in the direction of the locking of the shaft (101) against the coupling element. In order to undo the coupling of the shaft (101) end hook, the wiper is rotated in relation to the shaft, a gentle pressure is applied to open the bulges (12) and (13) and the wiper is moved in the opposite direction of the one indicated for the assembly process.

**[0019]** The fixing of the present invention when the side-lock system is used (Figure 5) requires the locking of the coupling element onto the wiper before it is fixed on the tip of the windscreen wiper shaft. That is done fixing said coupling element to the wiper's central pin (100) through its central bore (3); rotating the coupling element in the direction that liberates the lateral access to the side-lock hole to be used. The side-lock pin is then positioned on its corresponding hole (1/4" or 3/16") of the wiper, rotating and pushing the coupling element against the lateral pin set, until it locks on the corresponding hole (2 or 4).

**[0020]** The disassembly of the side-lock system is done pulling the coupling element on the opposite direction of the one used on the assembly process, until it unlocks, and then the side-lock pin is pulled out.

**[0021]** The present invention offers multiple advantages compared to the current state of the art. The most immediate is the effective standardization obtained by the shaft coupling elements for windscreen wipers, simplifying logistics, reducing the required stocks and the manufacturing costs.

**[0022]** Another advantage of the present invention is that the shape of the shaft coupling elements for windscreen wipers ensures an easy assembly of the wiper on the shaft, no longer requiring the use of force to couple the system's components and thus eliminating the risk of distortions that could harm the system's performance.

**[0023]** Another advantage of the present invention is that the presence of lateral chamfers on the holes (2) and (4) makes the assembly of the side-lock system easy, so that the user himself can both assemble and disassemble it with no trouble at all.

**[0024]** Another advantage of the present invention when compared to the current state of the art, for example revealed on the Brazilian Patent Application MU 8000354-0 of the same Applicant, is the elimination of any coupling parts that interfere with the rotation movement of the wiper's arc, favoring the system's performance.

**[0025]** Finally, the presence of the protuberances (10) and (11) adjacent to the central hole (3) makes the assembly of the coupling element on the wiper's central pin easy.

## Claims

1. **"ARRANGEMENT OF SHAFT COUPLING ELEMENT FOR WINDSCREEN WIPER"**, wherein it comprises a central body (1), three transversal coupling bores (2, 3 and 4) of different dimensions set on the central area of said main body (1) that presents the lower part of it's lateral walls cut away allowing direct access to said transversal coupling bores (2, 3 and 4), two lateral bulges (5 and 6) located at both lateral walls of the main body (1), being one in each of it's ends, two flexible adjustment pawls (7) and (8) located transversally on the upper part of the main body (1), a slack reducing moving part (9) located at the end of the main body (1) over which rests the windscreen wiper's shaft hook (101), two protuberances (10) and (11) adjacent to the central hole (3) and two moving locking bulges (12) and (13) located at the end of the main body (1) between which rests the windscreen wiper's shaft hook (101).

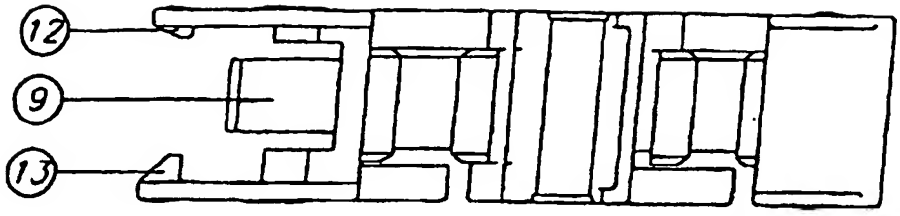


FIGURA 1

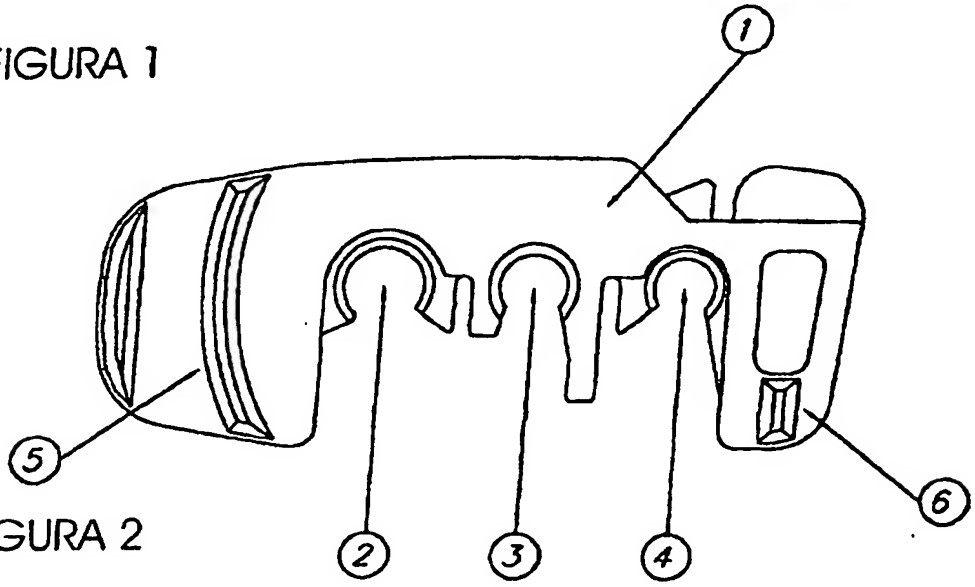


FIGURA 2

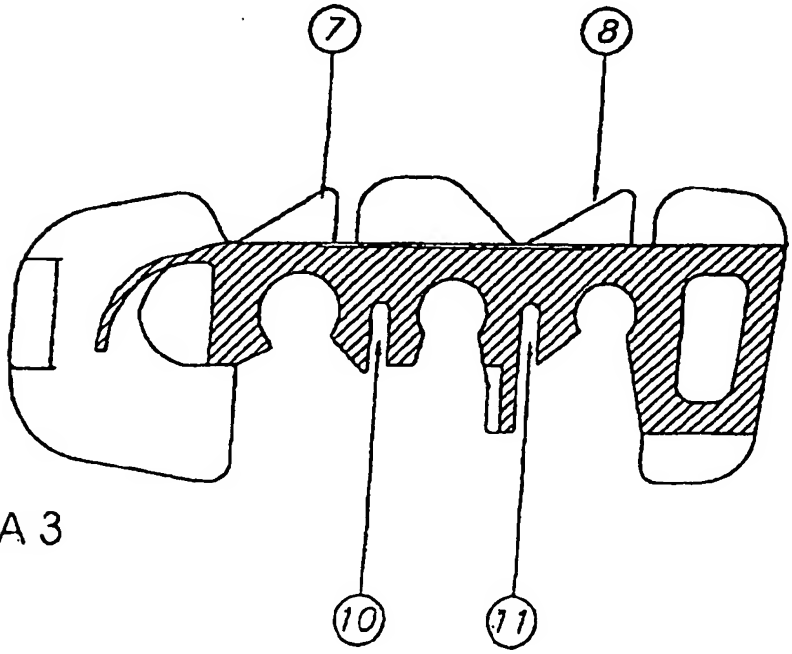


FIGURA 3

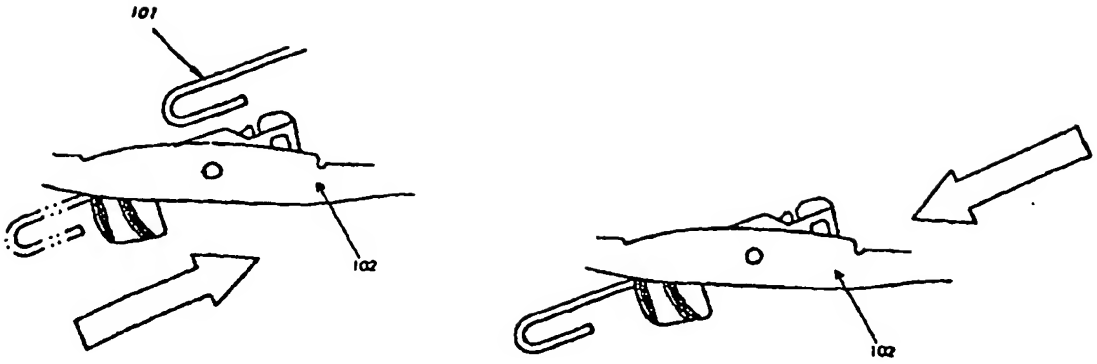


FIGURA 4

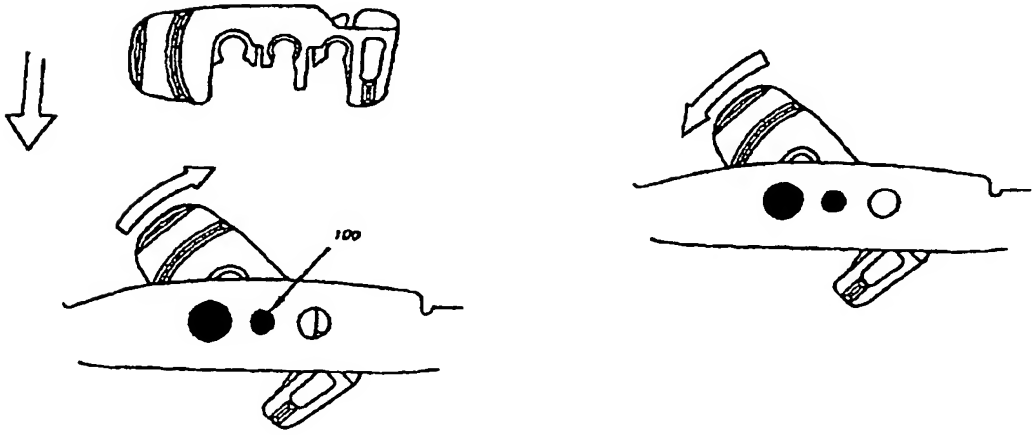


FIGURA 5

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# EUROPEAN SEARCH REPORT

Application Number
EP 01 30 0889

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
|---|---|---|---|
| A | US 5 937 474 A (HUSSAINI SAIED)<br>17 August 1999 (1999-08-17)<br>* column 1, line 27 - line 41; claim 1; figures 1-3,5 *<br>* column 2, line 22 - line 29 *<br>* column 2, line 51 - line 61 * | 1 | B60S1/40 |
| A | FR 2 631 299 A (VALEO SYSTEMES ESSUYAG)<br>17 November 1989 (1989-11-17)<br>* page 3, line 4 - line 18; figures 1,3 * | 1 | |
| A | US 5 632 059 A (LEE ALBERT)<br>27 May 1997 (1997-05-27)<br>* column 2, line 5 - line 10; claim 1; figures 2-6A *<br>* column 3, line 38 - line 47 *<br>* column 4, line 11 - line 20 * | 1 | |
| | | | TECHNICAL FIELDS SEARCHED (Int.Cl.7)<br>B60S |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 19 November 2001 | Sangiorgi, M |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 30 0889

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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19-11-2001

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82